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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,640	12/05/2001	Tsunehiko Yamazaki	3005-31	6794

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LEWIS F. GOULD, JR.  
DUANE MORRIS & HECKSCHER, LLP  
ONE LIBERTY PLACE  
PHILADELPHIA, PA 19103

EXAMINER
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PEREZ DAPLE, AARON C

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 04/26/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/004,640

Applicant(s)

YAMAZAKI ET AL.

Examiner

Aaron Perez-Daple

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Action is in response to Amendment filed 3/8/04, which has been fully considered.
2. Amended claims 1-3 and new claims 4-7 are presented for Examination.
3. This Action is made Final.

### *Claim Objections*

4. **Claim 1** is objected to because of the following informalities: The last line recites "control command" where it should recite -- control commands --. Appropriate correction is required.
5. **Claim 2** is objected to because of the following informalities: Lines 5 and 7 recite "said time parameter type polynomial" where they should recite --said time parameter polynomial--. Appropriate correction is required.
6. **Claim 3** is objected to because of the following informalities: Lines 4 recites "said time parameter type polynomial" where it should recite --said time parameter polynomial--. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. **Claim 3** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, lines 3-6, "at the time in future when said object to be controlled has

not yet moved on the basis of said time parameter type polynomial,” are not understood by the Examiner. It appears that the applicant is claiming a sequence of events within a method. However, the relative times of when the position and velocity are computed, when the object moves, and when the commanding action is executed are not clear. Furthermore, the phrase, “the time in future” lacks antecedent basis. For the purpose of applying prior art, the Office interprets that (1) the position and velocity are computed for a time in the future, (2) at the future time, a position and velocity are commanded at least partially based on the computed position and velocity, and (3) the object moves.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1, 3, 4 and 5** are rejected under 35 U.S.C. 102(b) as being anticipated by Trounson (US 5,926,389) (hereinafter Trounson).
11. As for claim 1, Trounson discloses a numerically controlled method of moving an object to be controlled along a predetermined locus, by controlling respective control axes in a joint space, said method comprising:
- approximating said locus by defining a spatial polynomial in a work space (col. 8, lines 25-33, “The manner in which...skill in the art.”);
- converting a parameter  $\lambda$  of said spatial polynomial, which is not dependent on time, to insert a time variable  $t$  function, thereby obtaining a time parameter polynomial defining

position as a function of time (This is considered inherent for the parameterization of the spatial polynomial, as understood by one of ordinary skill in the art. The use of  $\lambda$  is arbitrary and is understood to represent any parameter in the spatial polynomial function.; col. 8, line 41 - col. 9, line 2, "Once the time points...the y axis values.; Applicant is also referred to column 3 of the previously cited Minnich reference US 5,229,698.);

applying said time parameter polynomial to said respective control axes in said joint space, including distributing said time parameter polynomial over each said control axis (col. 3, lines 45-55, "The following is a...in the art.");

producing control commands for said respective control axes in said joint space on the bases of said time parameter polynomial as applied to said control axes in said joint space (col. 3, lines 45-55, "The following is a...in the art."; col. 8, line 56 - col. 9 line 2, "Once the time...y axis values."); and

moving said object to be controlled along said locus, while controlling said respective control axes in said joint space on the basis of said control command (col. 3, lines 10-21, "In the present invention...motion is produced."; col. 3, lines 45-55, "The following is a...in the art.").

12. As for claim 3, Trouson discloses the numerically controlled method as set forth in claim 1 wherein said control command is executed by computing a position and velocity at the time in future when said object to be controlled has not yet moved on the basis of said time parameter polynomial (col. 7, line 50 - col. 8, line 10, "The end products...that control cycle.").

13. As for claim 4, Trouson discloses a method for controlling an object in a work space, the object being positionable in the work space by controls operable to position the object in plural control axes, comprising:

defining a spatial locus of the object including a line in the work space, wherein the line is approximated by a spatial polynomial having displacement variables, the spatial polynomial representing the line by spatial variables independent of time (col. 8, lines 25-40, "The manner in which... User Interface Task 31.");

applying a time function to at least one said spatial variable, and converting said spatial polynomial to a motion polynomial by replacing said spatial variables with the time function, the motion polynomial having spatial variables as a function of time (This is considered inherent for the parameterization of the spatial polynomial, as understood by one of ordinary skill in the art.; col. 8, line 41 - col. 9, line 2, "Once the time points... the y axis values.; Applicant is also referred to column 3 of the previously cited Minnich reference, US 5,229,698.);

distributing motions defined by the motion polynomial over the plural control axes, each of the control axes having a corresponding axis motion as a function of time (col. 3, lines 45-55, "The following is a... in the art."; col. 8, line 56 - col. 9 line 2, "Once the time... y axis values."); and

controlling the plural control axes according to a respective said corresponding axis motion (col. 3, lines 10-21, "In the present invention... motion is produced."; col. 3, lines 45-55, "The following is a... in the art.").

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14. As for claim 5, Trouson discloses the method of claim 4, wherein the plural axes are controlled by feedback control loops responsive to displacement of the object and also to at least one of velocity, acceleration and jerk of the object, and wherein the control loops are at least partly responsive to a value of said at least one of velocity, acceleration and jerk derived mathematically from the motion polynomial (col. 7, line 50 - col. 8, line 10, "The end products...that control cycle."; col. 9, lines 11-50, "An expanded view...subsequent time periods.").

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. **Claims 2, 6 and 7** are rejected under 35 U.S.C. 103(a) as being obvious over Trouson in view of Pugh et al. (US 5,808,893) (hereinafter Pugh).

17. As for claims 2 and 6, Trouson teaches deriving the displacement, velocity and acceleration as functions of time from the time parameter polynomial and producing a control command at least partially based on these values (col. 7, line 50 - col. 8, line 10, "The end products...that control cycle."; col. 9, lines 11-50, "An expanded view...subsequent time periods."). Although the methods disclosed are equivalent to taking a derivative, Trouson does not explicitly teach taking a first and second derivative of the time parameter polynomial. Pugh teaches taking the first and second derivatives of the time parameter

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polynomial to derive the velocity and acceleration in order to provide enhanced machine control (col. 7, lines 16-45, "A complete turret...this manner, if desired."). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Trouson by taking the first and second derivatives of the time parameter polynomial to derive the velocity and acceleration, as taught by Pugh, in order to provide enhanced machine control.

18. As for claim 7, Trouson teaches a method similar to claim 6, comprising predicting at least one of a velocity, acceleration and jerk at a future point in time during control of said one of the plural axis (col. 7, line 50 - col. 8, line 10, "The end products...that control cycle.").

### ***Response to Arguments***

#### **Drawings**

19. Objection to the drawings are withdrawn in view of the drawing correction submitted 3/8/04.

#### **Specification**

20. Objections to the specification are withdrawn in view of the Amendment.

#### **Claim Objections**

21. Previous objections to claim 2 are withdrawn in view of the Amendment. New objections to the amended claim have been made above.

#### **112 Claim Rejections**



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22. The rejection of claim 3 under 35 USC 112, second paragraph, is hereby maintained.

Applicant did not adequately address this rejection in the Amendment. The rejection is maintained for the reasons previously presented and repeated above.

### **Prior Art Rejections**

23. Applicant's arguments with respect to the Pugh reference, US 5,808,893, have been considered but are moot in view of the new ground(s) of rejection. Pugh has been used together with Trounson (US 5,926,389) for the 103 rejection of claims 2, 6 and 7 above to teach those features which Applicant has already admitted in the third paragraph of page 23 of the Amendment.

### ***Conclusion***

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

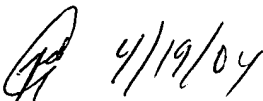
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Perez-Daple whose telephone number is 703-305-4897. The examiner can normally be reached on 9am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri can be reached on 703-305-0282. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Aaron Perez-Daple

  
Anthony Knight  
Supervisory Patent Examiner  
Group 3600